

U.S. Patent Application Serial No. 10/516,940
Amendment filed November 28, 2006
Reply to OA dated June 30, 2006

AMENDMENTS TO THE CLAIMS:

Please amend claims 1, 2, 5, 6, and 7, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A composition, comprising:

a metallic copper catalyst; for use in an ethylene addition reaction to provide a polyfluoroalkylethyl iodide from

a polyfluoroalkyl iodide; and

ethylene;

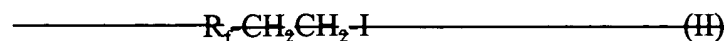
wherein the metallic copper catalyst is present in an amount in the range of 0.5 to 10 wt.% of the polyfluoroalkyl iodide.

Claim 2 (Currently Amended): The metallic copper catalyst composition according to Claim 1, wherein the polyfluoroalkyl iodide is a compound represented by Formula (I):



wherein R_f is a C_{1-6} polyfluoroalkyl; ~~and~~

~~the polyfluoroalkylethyl iodide is a compound represented by Formula (II):~~



~~wherein R_f is as defined above.~~

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Claim 3 (Original): A process for producing a polyfluoroalkylethyl iodide represented by Formula (II):



wherein R_f is a C_{1-6} polyfluoroalkyl,

the process comprising the step of reacting ethylene with a compound represented by Formula (I):



wherein R_f is as defined above, in the presence of a metallic copper catalyst.

Claim 4 (Original): The process according to Claim 3, wherein the metallic copper catalyst is a powdery metallic copper or a metallic copper supported on a carrier, and the reaction is conducted at a temperature of 50-200°C under a pressure of 0.01-3 MPa.

Claim 5 (Currently Amended): A process for producing polyfluoroalkylethyl iodide (IV), the process comprising the following steps (a) and (b) conducted in the presence of the same metallic copper catalyst:

(a) a step of reacting, in the presence of a metallic copper catalyst, tetrafluoroethylene with a compound represented by Formula (I):

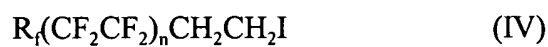


wherein R_f is a C_{1-6} polyfluoroalkyl, to produce a compound represented by Formula (III):



wherein n is an integer from 1 to 8 and R_f is as defined above; and

(b) a step of reacting, in the presence of said metallic copper catalyst, ethylene with compound (III) obtained in step (a) to produce a polyfluoroalkylethyl iodide represented by Formula (IV):



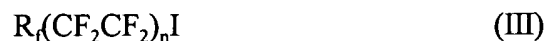
wherein R_f and n are as defined above.

Claim 6 (Currently Amended): A process for producing polyfluoroalkylethyl acrylate (VI), the process comprising the following steps (a), (b) and (c); ~~steps (a) and (b) being conducted in the presence of the same metallic copper catalyst:~~

(a) a step of reacting, in the presence of a metallic copper catalyst, tetrafluoroethylene with a compound represented by Formula (I):

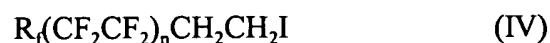


wherein R_f is a C_{1-6} polyfluoroalkyl, to produce a compound represented by Formula (III):



wherein n is an integer from 1 to 8 and R_f is as defined above;

(b) a step of reacting, in the presence of said metallic copper catalyst, ethylene with compound (III) obtained in step (a) to produce a compound represented by Formula (IV):



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wherein R_f and n are as defined above; and

(c) a step of reacting compound (IV) obtained in step (b) with a carboxylate represented by

Formula (V):

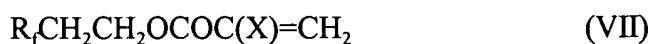


wherein X is H or CH_3 and M is an alkali metal, to produce a polyfluoroalkylethyl acrylate represented by Formula (VI):



wherein R_f , n and X are as defined above.

Claim 7 (Currently Amended): A process for producing a polyfluoroalkylethyl acrylate represented by Formula (VII):



wherein R_f is a C_{1-6} polyfluoroalkyl, and X is H or CH_3 ,

the process comprising the step of producing ~~reacting~~ a polyfluoroalkylethyl iodide ~~obtained~~ according to the production process of ~~item~~ claim 3 and represented by Formula (II):



wherein R_f is as defined above, and

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the step of reacting said polyfluoroalkylethyl iodide with a carboxylate represented by

Formula (V):



wherein X is as defined above, and M is an alkali metal.